NAVAL MEDICAL RESEARCH AND DEVELOPMENT
NEWS
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Science and Engineering Apprenticeship Program Mentors Students

2010 SEAP students in the Enteric Diseases Department, NMRC. From left (students) Emily Scher, Allison Brouckman, Nadia Thura and Daniel Tuerff; (mentors) EDD Head Capt. Stephen Savarino, Lt. Michael Prouty, Mr. Chad Porter, Dr. Yang Liu and Cmdr. Robert Gormley. Photo by Phil Collins.

By Capt. Stephen J. Savarino, NMRC

The Department of Defense (DoD) nurtures young people's interest in science and engineering through a variety of programs, including the Science and Engineering Apprenticeship Program (SEAP) for high school students. Since 1980 this program has offered qualified students placements in Army and Navy laboratories for a paid eight-week apprenticeship. Each student is paired with a scientist mentor and undertakes a hands-on research project.

Nationwide, fifteen Army and sixteen Navy laboratories participate in the program, including the Naval Medical Research Center (NMRC) and the Walter Reed Army Institute of Research (WRAIR) in Silver Spring, Md. Students at NMRC and WRAIR are supported by the Office of Naval Research and George Washington University, respectively.

During the summer of 2010, NMRC and WRAIR hosted forty-two high school students. Lt. Mario Guerrero, the NMRC coordinator, provided organi-

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In this issue

Commanding Officer's Message

Greetings,

This month, October 6, we completed a BRAC initiative with the stand-up of NAMRU-Dayton at Wright Patterson Air Force Base in Ohio. The Base Realignment and Closure Act of 2005 enabled the Department of Defense to realize greater efficiencies and to promote transformation by realigning infrastructure with future defense strategy. In this action, two Naval Health Research Center detachment laboratories combined – the Naval Aerospace Medical Research Laboratory, relocating from the Naval Air Station Pensacola to Dayton, and the Environmental Health Effects Laboratory, already at WPAFB. While retaining the unique missions and capabilities of NAMRL and EHEL in the areas of aerospace medicine and toxicology research, NAMRU-Dayton assumes a new role as the Navy's flagship laboratory in the newly formed DoD Center of Excellence for Aerospace Medicine Research, Education and Training located at WPAFB.

On another subject, I would like to congratulate the staff of the medical library that supports the researchers and staff at NMRC and WRAIR. The Gorgas Memorial Library was selected by the Library of Congress to receive the 2009 Federal Library/Information Center of the Year Award in the Small Library/Information Center category. To the library staff – thank you for all you do to support Navy Medicine R&D.

Commanding Officer sends,
Richard L. Haberberger, Jr.
CAPT, MSC, USN

New Navy Medical Research Laboratory Standing Up in Dayton

http://www.med.navy.mil/sites/nmrc/Pages/namrud.htm

By Renee Lojewski, NAMRL PAO

The activation ceremony for the Navy's newest medical research laboratory, Naval Medical Research Unit-Dayton (NAMRU-Dayton), was held onboard Wright Patterson Air Force Base, Dayton, Ohio, Wednesday, October 6, 2010. The command activation officially marked the historic merger of two esteemed institutions, Navy Medicine's Environmental Health Effects Laboratory, operating in Dayton, and the Naval Aerospace Medical Research Laboratory (NAMRL), located in Pensacola, Fla.

The activation ceremony commenced at 9:00 a.m. and was hosted by Capt. Richard L. Haberberger, Jr., Commanding Officer, Naval Medical Research Center, with the keynote address delivered by Rear Admiral Eleanor Valentin, Commander, Navy Medicine Support Command.

The ceremony served to formally announce NAMRU-Dayton's role as Navy Medicine's global research leader in areas such as toxicology, acceleration effects, aviation medical standards, physiological and cognitive effects of altitude, aviation personnel selection testing, vision research, and other key aviation-related areas.

Capt. Keith Syring, Aerospace Physiology Program Manager and Specialty Leader, has been named the first Commanding Officer of NAMRU-Dayton and Cmdr. Rita Simmons, currently Officer in Charge, NAMRL, will serve as the Executive Officer. NAMRU-Dayton, in conjunction with the Air Force 711th Human Performance Wing, will form the BRAC-directed DoD Center of Excellence for Aerospace Medicine Research, Training, and Education.

Combining the Navy's scientific and technical expertise in the fields of aerospace medicine and toxicology research will enable Navy Medicine to provide expanded support for warfighter performance in a myriad of operational environments.

Rear Adm. Eleanor Valentin, keynote speaker at the NAMRU-Dayton activation.

Navy Studies Unique Undersea Operational Medicine Challenges

The Naval Medical Research Center's (NMRC's) Undersea Medicine Department (UMD) works to improve performance and reduce injury in deployed sailors who work in undersea occupations. The department has the capability to perform advanced undersea medicine research in a laboratory designed to use scenarios directly related to U.S. Navy diving and submarine escape.

"This unique laboratory designs and executes research specific to decompression sickness, disabled submarine rescue and hyperbaric oxygen toxicity," said Capt. Richard T. Mahon, head of the department. "UMD maintains a staff of three Undersea Medical Officers, three Ph.D. scientists, and a support staff of seventeen that includes certified chamber operators and skilled research technicians. This team has more than 15 hyperbaric chambers and 2400 square feet of unrivaled laboratory space."

Chamber technicians Pratik Patel (left) and Jennifer Dorsey (right) prepare for multiple hyperbaric exposure procedures. Photo by Phil Collins.

The comprehensive disabled submarine rescue effort is an example of one of the research efforts the team supports.

"While the internal pressure of an operational submarine is maintained at surface pressure, a disabled vessel will likely experience increased pressure due to flooding or use of air-banks," explained Mahon. "This would expose survivors to gas accumulation in their tissue, putting them at risk for decompression sickness (DCS). DCS results when accumulated gas exits tissue forming bubbles that can obstruct blood flow or cause inflammation. Standard decompression schedules allow this gas to be safely exhaled before bubbles form. However, a disabled submarine scenario would not likely accommodate standard decompression. Additionally, a disabled submarine event would likely take place in remote locations at extreme depths that pose a logistical challenge that demands flexibility."

One research project is examining the paradoxical role hyperbaric oxygen (HBO) plays in undersea medicine. HBO has demonstrable benefits in the treatment of decompression sickness and shows promise as a biomedical strategy to support the rescue of survivors in the event of a disabled submarine. However, HBO for extended periods can also compromise the pulmonary system or even induce seizures. Both the therapeutic and toxic effects are currently under study at the laboratory. Mahon points out that oxygen breathing accelerates the wash out of accumulated gas. The department's research has demonstrated that breathing oxygen in a hyperbaric environment for just 45 minutes can prevent severe DCS. In a disabled submarine with a large number of survivors, this can significantly improve rescue operations.

Although these findings are exciting, it is not without a downside. If the internal submarine pressure is greater than three times normal pressure, survivors will need to undergo onerous decompression. Pressure at five atmospheres requires decompression in excess of 30 hours, clearly unacceptable, especially if the situation is deteriorating, Mahon went on to explain. To address this, UMD developed emergency operating decompression schedules reducing standard decompression time to just four hours. This has the potential to hasten survivor recovery and save lives.

Standard therapy for DCS is hyperbaric oxygen that requires a chamber and skilled support staff. Transporting such assets to a disabled submarine site requires herculean logistics. In response, UMD is examining non-recompressive DCS therapies, the most promising being intravenous perfluorocarbons. Perfluorocarbons dissolve gases in much greater quantities than human plasma, thereby minimizing bubble formation and accelerating gas elimination. UMD has demonstrated in the laboratory that perfluorocarbons can significantly reduce mortality due to DCS. The results are promising, but a lot more work needs to be done.

"UMD research efforts will continue to focus on enhancing performance and improving safety for divers and submariners," said Mahon. "Its inimitable capabilities and expertise keep this lab at the forefront of diving research."

Science and Engineering Apprenticeship Program Mentors Students

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2010 SEAP student Emily Scher working side-by-side with mentor Cmdr. Robert Gormley at NMRC.

zational support to the fourteen Navy student participants and their mentors. Four NMRC SEAP students were placed in the Enteric Diseases Department (EDD), Infectious Diseases Directorate.

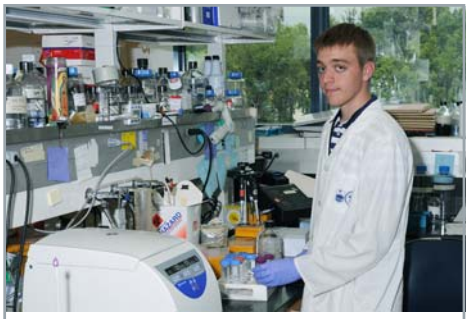
Daniel Tuerff returned this summer for a second year of SEAP. Before starting the program, Tuerff thought he might be 'running errands or filing papers,' a notion quickly dispelled by his mentor, Lt. Michael Prouty, who engaged Tuerff in projects aimed at better understanding the pathogenesis of *Campylobacter jejuni*, one of the world's leading cause of foodborne illness. This summer, Tuerff created a panel of mutations in a surface protein of *C. jejuni* thought to play a role in intestinal adherence, trying to pinpoint the parts of this protein that participate in binding. Tuerff's summer laboratory experiences have influenced his decision to major in biochemistry or biology when he enters college next year.

Emily Scher, a rising high school senior and a whiz in computer sciences, had been frustrated by the seeming gap between this field and biology, her second love. Cmdr. Robert Gormley selected Scher for an internship and she applied her exceptional abilities in programming and computation to identify possible vaccine candidates from the pan-genome of Shigella, a major global cause of dysentery in military personnel during war and in young children in resource-poor countries. In her own words, Scher found that her project 'perfectly combined my two interests in a way I found fascinating.' She has now seriously expanded her vocational interests to include the possibility of a research career in bioengineering or bioinformatics.

Nadia Thura's internship turned out to be her first hands-on experience in public health research, something that she previously could only imagine. In a library-oriented research project, Thura critically reviewed the world's literature on experimental human challenge with Shigella, writing a compelling review of the subject under the mentorship of Mr. Chad Porter, an epidemiologist in the Clinical Trials and Epidemiology Branch, EDD. The mentor-student relationship can be enriching in many different ways, for student and mentor. In Thura's case, she found it 'both informative and intriguing to work with someone actually in the field I hope to enter – public health – as his work is a real-life example of public health in action.' Her experience also taught Thura that public health and prevention are a bedrock of the military medical system, something she hopes to examine further in her college years and beyond.

2010 SEAP student Nadia Thura reviewing data with mentor Mr. Chad Porter at NMRC.

For Allison Brouckman, a rising senior at Thomas Jefferson High School for Science and Technology, science has been a favorite subject since her first days of grade school. In high school, she has pursued this interest through advanced coursework. Working over the summer under the mentorship of Dr. Yang Liu, a post-doctoral research fellow in the Molecular Biology and Biochemistry Branch, EDD, Brouckman came into a lab that featured a supportive team of scientists and technicians with a passion for science, a readiness to extend a helping hand, and a push to think critically. Under Liu's direction, Brouckman successfully cloned, expressed and purified two fragments of a bacterial outer membrane protein, each purported to feature unusual activities that mold the shape of a virulence factor on the bacterial surface of enterotoxigenic *Escherichia coli*, the number one global cause of travelers' diarrhea. On the one hand, Brouckman admitted to working harder and longer this summer than ever before. On the other, she loved what she was doing, soaring through each day buoyed by raw curiosity and a purpose of mind focused on solving the hypotheses set forth by Liu.



2010 SEAP student Daniel Tuerff at NMRC. Photos by Phil Collins.

Like many of their fellow SEAP trainees this summer, Brouckman, Thura, Scher and Tuerff were smitten by science in action. Such federal programs are vital to attracting youngsters into science and engineering career paths. Within DoD, several programs have been developed and evaluated that help students engage in inquiry-centered science, technology, engineering and mathematics.

2010 SEAP student Allison Brouckman (left), working with mentor Dr. Yang Liu at NMRC.

Naval Health Research Center Hosts Mexican Scientists from InDRE

Dr. Carlos DeMattos (left) and technician Mr. Scott Vo (right) analyze the results of multiplex PCR reaction with Ms. Patricia Gabino-Noriega and Ms. Monica Guadalupe Viveros-Terrazas. Photo provided by NHRC.

By Dr. Chris Myers, NHRC

Ms. Patricia Gabino-Noriega and Ms. Monica Guadalupe Viveros-Terrazas from the Instituto Nacional de Referencia Epidemiologica (InDRE), the Mexican National Public Health Laboratory, visited the Naval Health Research Center (NHRC) in September for training in respiratory pathogen detection techniques. The training consisted of both classical culture techniques and more modern methods, such as real-time polymerase chain reaction (PCR). These training exercises featured some of NHRC's advanced platforms for pathogen detection that can identify gram-positive and gram-negative bacterial pathogens while simultaneously performing antibiotic sensitivity tests.

The visitors were also trained on a multiplex PCR assay designed to detect atypical pneumonia pathogens. This assay, which was designed and validated at NHRC, is of particular interest due to the recent increase of *Bordetella pertussis* cases among pediatric populations in California and Mexico. With the goal of improving the quality control/quality assurance program at InDRE, NHRC provided technical standard operating procedures.

The collaboration to train scientists and build capacity at NHRC and InDRE is funded by a grant from the Department of State's Biosecurity Engagement Program. NHRC partners with the Centers for Disease Control and Prevention's Border Infectious Disease Surveillance and Early Warning Infectious Disease programs in this work.

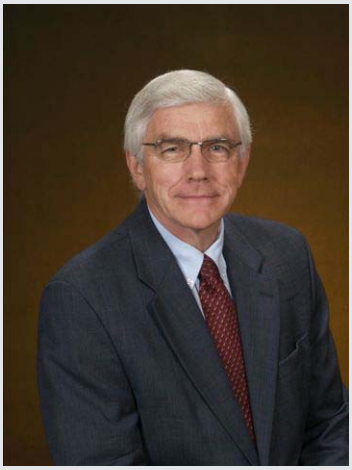
Over the past six years, the Armed Forces Health Surveillance Center has supported respiratory disease surveillance along the U.S.-Mexico border. This collaboration helped in the early identification of the pandemic A/H1N1 influenza strain that emerged in 2009.

Dr. David DeMets Lectures on Clinical Trials at NMRC

By Capt. Thomas Richie, NMRC

Dr. David DeMets, a professor at the University of Wisconsin, presented the seventh lecture in the Seminars in Clinical Investigation 2010 series at the Naval Medical Research Center (NMRC). The title of his talk was "Challenges in Clinical Trials: Some Old, Some New." His presentation was warmly received by the enthusiastic audience.

An expert in clinical trial design, Dr. DeMets has written four major texts on the topic based on extensive experience gained during 12 years at the National Institutes of Health, where he served as the Chief of the Biostatistics Branch, and 27 years at the University of Wisconsin, where he served as the Chair of the Department of Biostatistics and Medical Informatics. Dr. DeMets has devoted his career to providing critical analyses of clinical trials with the objective of increasing the efficiency and power of clinical trial designs.



Recent examples of his work can be found in two 2010 publications: "Bias and trials stopped early for benefit," which was published in the *Journal of the American Medical Association*, and "Some drop-the-loser designs for monitoring multiple doses," published in the journal, *Statistical Methods.* During his lecture at NMRC, Dr. DeMets shared key lessons learned during his career, focusing on the importance of intention-to-treat analysis, the pitfalls of excluding study subjects, the limitations of non-inferiority designs and the benefits of novel adaptive designs.

Combat Casualty Care...Our First Year in San Antonio!

By Lt. Cmdr. Anne L. McKeague, Head, NAMRU-SA CCC Department

This has been a fantastic first year for Combat Casualty Care (CCC) Research! Although we are not fully transitioned into the new Battlefield Health and Trauma (BHT) research building on Ft. Sam Houston, Texas, research is being conducted in infusible hemostatics for non-compressible hemorrhage (bleeding).

This is urgently needed, as non-compressible hemorrhage accounts for 50 percent of preventable deaths we are currently seeing in combat operations. Another significant area of research is the evaluation of hemostatic agents, which builds upon successful research previously conducted at NMRC that led to selection of the hemostatic agent Combat Gauze as the only recommended standard of care by the Tactical Combat Casualty Care Committee Guidelines.

Both these research projects serve the urgent combat injury needs of our warfighters and their supporting medical personnel.

The Naval Medical Research Unit-San Antonio (NAMRU-SA) will utilize an innovative protocol to evaluate Combat Gauze and various other hemostatic agents in conjunction with rapid and delayed fluid resuscitation and will examine the safety and efficacy of these agents after injury repair. Both these research projects serve the urgent combat injury needs of our warfighters and their supporting medical personnel.

The CCC Department is also working with Marine Corps Systems Command through ongoing projects. These projects include the evaluation of patient active warming systems to prevent or treat hypothermia. The pilot study to evaluate these systems was presented as a poster at the 2010 conference for the Advanced Technological Applications for CCC.

Researchers at NAMRU-San Antonio evaluate the patient active warming systems used for hypothermia prevention for Marine Corps Systems Command. Photos provided by NAMRU-SA.

NAMRU-SA is also the lead laboratory for the upcoming Tri-Service tourniquet study, which will evaluate tourniquets, both new and those in current use, to ensure the best devices are fielded to all military personnel.

Our relocation to San Antonio is proving fruitful for the Navy! We have established collaborations with the Army's Institute of Surgical Research (ISR) located at Fort Sam Houston. These collaborations include the evaluation of pre-hospital life-saving interventions performed in combat, emergency telemedical direction for treating casualties in an operational setting and the development of a hands-free device to record treatment of casualties in real-time, which will provide critical data not routinely captured in an out-of-hospital setting.

As we transition to the BHT Research Institute, we expect these collaborations to continue to grow.

We continue to break new ground by providing guidance to senior policymakers within the Department of Defense (DoD) through participation on the DoD Steering Committee for Hemorrhage and Resuscitation. This committee will provide recommendations for research and funding priorities for this vital area of research.

As we wait to move into our new home in the BHT, CCC research is ongoing and collaborations with our sister services, such as utilizing the Camp Bullis Medical Training Facility, will enhance our ability to work in an operational environment close to the BHT. We will continue to foster our environment of collaboration.

Simulators were used to test the emergency telemedical direction technology at the Tactical Simulation Facility for Military Medicine operated by the Defense Medical Readiness Training Institute.

NAMRU-3 Teams with NEPMU-2 to Fight Malaria in Liberia

By Darnell P. Gardner, Jr., Public Affairs Officer, NAMRU-3

U.S. Naval Medical Research Unit No. 3 (NAMRU-3) combined forces with the Navy Environmental Preventive Medical Unit No. 2 (NEPMU-2), at the request of Africa Command (AFRICOM), to provide force health protection through a spraying operation to control malaria-carrying mosquitoes at the living quarters of U.S. military serving in Liberia. U.S. airmen and Marines are deployed to Liberia in support of Operation Onward Liberty, a cooperative agreement between the U.S. military and Liberian government focused on rebuilding the Liberian National Defense Force.

Lt. Cmdr. Peter Obenauer, NAMRU-3 lead vector biologist and troop commander, said, "Funding from the Department of Defense Global Emerging Infectious Surveillance program (DoD-GEIS) enabled us to provide this force health protection maneuver and continue our malaria-related scientific research in one of the most malarious regions of the world. NEPMU-2's ability to function as a global responder to disease outbreaks, coupled with NAMRU-3's subject matter experience with vector-borne diseases, creates a synergy perfectly suited for this type of operation."

After six months of developing a partnership with the Liberian Institute for Biomedical Research (LIBR), Obenauer, along with Lt. Kathryn Barbara, NEPMU-2 entomologist, and Preventive Medicine Technicians (PMT) HM1 Leslye Brown-Ruiz and HM1 Noel Torres, deployed with a full complement of backpack sprayers, insecticides and mosquito ultraviolet light traps to control mosquitoes and monitor their populations.

HM1 Leslye Brown-Ruiz (left), Lt. Kathryn Barbara (center) and Lt. Cmdr. Pete Obenauer (right) prepare equipment for spray operation.

HM1 Noel Torres (left) and Lt. Cmdr. Peter Obenauer (center) preparing for a test run to ensure equipment is functioning properly before the actual spray operation. Photos by Darnell P. Gardner, Jr.

"Ultimately we want to provide an extra layer of protection for U.S. forces serving in Liberia. Along with that, we will be instructing military personnel on proper preventive measures to include use of mosquito repellants, bednets and chemoprophylaxis (medications for malaria prevention)," Barbara explained.

"Operation Spray-Down" commenced at dawn September 21. Spray crews were divided into two-person teams composed of a sprayer and spotter. Due to limited visibility and mobility of the protective gear used for spraying, spotters were essential for effective maneuvering. Teams began spraying water-based insecticides on the walls of the domiciles, providing an invisible layer of protection against mosquitoes. By design, when mosquitoes land on the treated surfaces, the insecticides enter their body, causing distress and eventually death, breaking the chain of disease transmission. Malaria transmission occurs when a female Anopheles mosquito becomes infected with malaria after feeding on an infected human and then transmits malaria to another human the next time she feeds. Brown-Ruiz said, "This was a great opportunity for me to apply my occupational pest control certifications to enhance mission readiness of our troops serving abroad!"

Torres explained, "We successfully treated almost 200 rooms totaling over 15,000 square feet of living space. The true impact of our mission will be determined by the overall reduced rate of vector-borne diseases in our fellow airmen and Marines serving in the region."

Future collaborations with LIBR will include capacity-building projects such as the construction of a mosquito laboratory equipped with the most up-to-date microscopes, mosquito and larval traps, and mosquito rearing chambers. On September 26-27, NAMRU-3 hosted a training session for LIBR members focusing on mosquito identification, control, surveillance and biology .

NHRC Researchers Developing Psychological Stress Mitigation Tools

Combat deployment involves unique risks and stressors and places burdens on families that extend beyond the typical problems associated with geographical separation. Combat deployment is a significant risk factor for psychological distress. Several stress mitigation tools are being developed at the Naval Health Research Center (NHRC).

One is the Post-deployment User Guide: A Transition Workbook for Veterans. NHRC researchers developed the Post-deployment User's Guide (PUG) to assist returning combat veterans with their home front transition. The organizing theme of the PUG is goal-setting and the guide includes worksheets and tools to help returning veterans prioritize their lives, set new short-term goals and work to achieve them. The PUG offers simple activities and practical information in several areas including personal growth, thoughts and relationships; mental and physical health; grief and guilt; recreation and relaxation; substance use; finances; career; and legal affairs.

(Left) The Post-deployment User Guide, designed to assist returning warfighters and their families.

The Marine Corps plans to distribute NHRC's post-deployment workbook as part of their Warrior Transition Programs.

(Right) A page from the Graphic Novel for Expeditionary Corpsmen.

Another stress mitigation tool is the graphic novel for Expeditionary Corpsman. Results from NHRC's in-theater surveys indicate that Hospital Corpsmen (HMs) experience greater psychological strain than almost any other group of sailors deployed to combat zones. Corpsmen in war zones experience a unique combination of stressors, since many are exposed to direct combat while accompanying Marine Corps teams on a variety of missions, interspersed with caregiver stress. To help prepare HMs for the many challenges awaiting them during deployments, NHRC created a graphic novel telling the stories of four fictional Corpsmen on a deployment to Iraq at the height of Operation Iraqi Freedom. The protagonists grapple with having to kill enemy combatants; being unable to save the life of a dying Marine; home front issues such as injuries to their children; and other issues that test their resilience. The novel is intended to psychologically prepare HMs by realistically portraying common concerns faced in war zones and to serve as a discussion tool for lessening the stigma associated with combat stress.

Comprehensive Rapid Bioidentification System Arrives in San Diego

By Cmdr. Patrick J. Blair, NHRC

The emergence of pandemic influenza A virus has exposed gaps in the diagnosis, characterization and treatment of emerging viruses and points to the need to develop and test rapid genomic screening methods to identify and characterize newly emerging pathogens. Ideally, screening platforms will provide information to assist in the prediction of strain or subtype, pathogenicity and drug resistance.

Towards this goal, the Naval Health Research Center (NHRC) has partnered with the Defense Advanced Research Projects Agency to install the first commercially available PLEXID Bioidentification System at their laboratory in San Diego. The PLEXID combines up-front reverse transcription polymerase chain reaction with electrospray ionization mass spectrometry. Theoretically, all bacterial or viral pathogens can be detected by the platform. To accomplish this, primers with conserved genetic motifs are designed around specific viral or bacterial targets. The resulting amplicons are sorted based upon base composition (BC). For influenza, "BC" is a function of six targets from the influenza "core" genes. High throughput screening allows for complete analysis from original patient specimens in less than six hours. There are a number of plates to assist with bacterial and viral pathogen diagnoses.

In April 2009, an earlier version of the PLEXID, the IBIS T-5000, provided the first molecular evidence of the pandemic A/H1N1 virus at NHRC. In their current work, investigators hope to assess risk of reassorted or newly emerged viruses from samples collected in Department of Defense surveillance activities.

Jevitts Receives Award for Chem/Bio Defense Work

Ms. Elizabeth Jevitts, QA/PT Manager for the fleet biological warfare confirmatory labs in the NMRC Biological Defense Research Directorate (BDRD), was recently named one of the Chemical and Biological Defense FY2010 Most Accomplished and Responsive CBD Community Members. Jevitts' outstanding performance positively contributed to the goals and mission of the Navy and the nation by increasing the readiness of Sailors to fight and win in a chemical and biological wartime environment.

NMRC Commanding Officer Capt. Richard L. Haberberger, Jr. (left) presents the FY2010 Most Accomplished and Responsive CBD Community Member award to Ms. Elizabeth Jevitts.

"I feel delighted to be recognized by my colleagues. I have worked for BDRD for eight years, and most of that time has been spent working with the confirmatory labs in the fleet," said Jevitts.

The award was given to members of the JBAIDs Accelerated Installation Team for their dedication, motivation, hard work and tireless support of the Navy's Chemical and Biological Defense program. Jevitts and the rest of the lab installation team were recognized by the Naval Sea Systems Command, the Office of the Chief of Naval Operations, and the Command, U.S. Fleet Forces Command.

NMRC's New Safety Officer

Lt. Cmdr. William Barnett, Medical Service Corps, U.S. Navy, recently joined the Naval Medical Research Center (NMRC) as the command's new Safety Officer. Barnett replaced Cmdr. Linda Byrnes, who retired in June.

Prior to joining NMRC, Barnett was assigned to Frigate Class Squadron/Commander, Destroyer Squadron Fourteen as Industrial Hygiene Officer/Safety Officer and Environmental Coordinator.

Greetings from the NMRC Ombudsman!

I hope everyone is settling into Fall and that the kids have adjusted to being back at school.

October is Domestic Violence Awareness Month, and I wanted to bring to everyone's attention this very important topic. The Department of Defense defines domestic violence as an offense under the United States Code, the Uniform Code of Military Justice, or state law that involves the use, attempted use, or threatened use of force or violence against a person, or the violation of a lawful order issued for the protection of a person who is: (a) a current or former spouse; (b) a person with whom the abuser shares a child in common; or (c) a current or former intimate partner with whom the abuser shares or has shared a common domicile. Domestic violence can happen to anyone of any race, age, religion or gender and can affect people of all socioeconomic backgrounds, education levels and military ranks.

- Of the millions of people abused each year, approximately 4 million are American women.
- One out of three women around the world has been beaten, coerced into sex or otherwise abused during her lifetime.
- Some estimates say almost 1 million incidents of violence occur against a current or former spouse, boyfriend or girlfriend per year.

Please call 1-800-700-SAFE 24 hours a day, 7 days a week if you or someone you know may be experiencing domestic violence.

Family Care Plans: A Family Care Plan outlines the logistical, financial, medical, educational and legal documentation necessary to ensure that dependent children will be cared for during a service member's absence due to deployment or training. Family Care Plans (DODI 1342.19) are required for most service members with dependents. Make sure your family is taken care of. Check out www.militaryonesource.com or 1-800-342-9647 for more information.

If you need information on these or other resources, please contact me at angela.prouty@med.navy.mil or 217-722-4981.

Angela Prouty
Ombudsman, NMRC

Who We Are - Environmental Health Effects Laboratory

Environmental Health Effects Lab Looks to the Future

By Lt. Cmdr. Michael Stockelman, EHEL

Since its founding, the Environmental Health Effects Laboratory (EHEL) has studied health risks of atmospheres encountered in military occupational and deployed settings. In response to new Navy and Department of Defense (DoD) needs, EHEL is expanding and diversifying its expertise and capabilities for inhalation research.

A capability coming online is nanomaterial inhalation exposure. Military applications of nanomaterials exploit their unique chemical and physical properties. These novel applications present unknown potential health risks. To test these possible risks, EHEL is adding the capacity to generate and monitor nanomaterial aerosols. Plethysmographs will support measurement of air movement in and out of lungs, a sensitive indicator of the critical toxic effect of pulmonary irritation. A hyperbaric chamber permits investigation of therapeutic and harmful effects of elevated air pressure. A new aerosol generation system is used in the study of health effects of elevated dust exposure. A novel combination of a sound generation system with inhalation chambers is being used in the study of chemical exposures and hearing loss.

Another capability is an *in vitro* toxicology core laboratory, based on the idea of conducting experiments in dishes rather than whole organisms. Using a panel of assays, including cultured cells to assess cell damage, lung and skin tissue models to detect effects on organs, and microbial and cellular assays to measure genetic damage, allows EHEL to quickly and economically make first-pass estimates of the toxicity of new materials. EHEL has applied this approach to novel alternative fuels and biofuels in development by the Navy and Air Force and to Middle East particulate matters.

EHEL has had a longstanding program for assessing neurological and behavioral effects of environmental risks. One powerful instrument for this work is a multi-electrode array. This system allows tissue to be studied over the course of hours to days, with monitoring of electrical activity across different brain regions. This is particularly powerful for characterizing specialized effects of chemicals that specifically impact localized regions of the brain. EHEL also uses behavior assays to assess learning and memory, reflexive behavior, reaction times, and hearing function.

With these initiatives and others, EHEL will be entering the NAMRU-Dayton era engaged in an active and intense portfolio of highly relevant projects. The momentum of this work and growth sets the stage for investigators at EHEL to explore new Navy research directions in collaboration with their counterparts in the Navy aerospace medicine group.

Lt. Cmdr. Michael Stockelman assays cell surface markers using flow cytometry to determine the effects of tungsten in drinking water on the function of the immune system. Photo provided by EHEL.

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